

SHIP PRODUCTION COMMITTEE
FACILITIES AND ENVIRONMENTAL EFFECTS
SURFACE PREPARATION AND COATINGS
DESIGN/PRODUCTION INTEGRATION
HUMAN RESOURCE INNOVATION
MARINE INDUSTRY STANDARDS
WELDING
INDUSTRIAL ENGINEERING
EDUCATION AND TRAINING

October 1999
NSRP 0526
N8-96-3

THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

Application of Industrial Engineering Techniques to Reduce Workers' Compensation and Environmental Costs - Deliverable A

U.S. DEPARTMENT OF THE NAVY
CARDEROCK DIVISION,
NAVAL SURFACE WARFARE CENTER

in cooperation with
National Steel and Shipbuilding Company
San Diego, California

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE OCT 1999		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE The National Shipbuilding Research Program, Application of Industrial Engineering Techniques to Reduce Worker's Compensation and Environmental Costs - Deliverable A				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Surface Warfare Center CD Code 2230-Design Integration Tools Bldg 192, Room 128 9500 MacArthur Blvd, Bethesda, MD 20817-5700				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES 7	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

DISCLAIMER

These reports were prepared as an account of government-sponsored work. Neither the United States, nor the United States Navy, nor any person acting on behalf of the United States Navy (A) makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness or usefulness of the information contained in this report/manual, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or (B) assumes any liabilities with respect to the use of or for damages resulting from the use of any information, apparatus, method, or process disclosed in the report. As used in the above, "Persons acting on behalf of the United States Navy" includes any employee, contractor, or subcontractor to the contractor of the United States Navy to the extent that such employee, contractor, or subcontractor to the contractor prepares, handles, or distributes, or provides access to any information pursuant to his employment or contract or subcontract to the contractor with the United States Navy. ANY POSSIBLE IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR PURPOSE ARE SPECIFICALLY DISCLAIMED.

THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

PANEL SP-8 INDUSTRIAL ENGINEERING

Report Number 0526

APPLICATION OF INDUSTRIAL ENGINEERING TECHNIQUES TO REDUCE WORKERS' COMPENSATION AND ENVIRONMENTAL COSTS

SUBMITTED BY:

**NATIONAL STEEL AND SHIPBUILDING COMPANY
SAN DIEGO, CALIFORNIA**

**In Cooperation with:
Gulf Coast Region Maritime Technology Center
University of New Orleans
New Orleans, Louisiana**

DELIVERABLE A

PROJECT TEAM DEFINITION AND ESTABLISHMENT OF PROJECT SCOPE

PROJECT TEAM DEFINITION

In establishing the Safety Improvement Team to define the project scope, representatives from the following areas were required in addition to the Project Manager and Project Engineer: Training, Safety, Workers' Compensation and Production. The Production representatives were selected from areas of the shipyard where there had historically been problems with high injury rates or high severity rates.

Also, it was desired that the representative be a member of management so the team would have the authority present to make necessary authorizations and changes. The Safety Process Improvement Team was then formed based on the above and consisting of the following members:

NAME	POSITION
Eric Murray	Controller (Risk Management & Workers' Comp)
Jim Paulson	Manager Safety
Brienn Woods	Manager Training & Development
Judie Blakey	Superintendent Paint, Blast & Ways
Bob Hillstrom	Manager Steel Erection
Dave Langenhorst	Superintendent Electrical & Electronics
Fred Hogan	Project Engineer
Tom Fawcett	Project Manager

ESTABLISHMENT OF PROJECT SCOPE

The Safety Process Improvement Team's basic philosophy in developing the project approach was to develop a pilot process and methodology for managing a shipyard safety program which would apply to any shipyard. Thus, the project approach suggested in the abstract and in NASSCO's original project proposal was reevaluated against that criterion. The project team felt that the abstract approach to the project would generate a one time benefit without establishing a lasting process for successfully managing shipyard safety programs.

Based on that premise, a different approach was taken to accomplishing the project objectives. The basic premise of the project approach was that the hourly production workers had to be intimately involved in order for any safety program to be successful. Two primary methods of hourly employee involvement were selected for pilot approaches to managing safety.

The first approach was the establishment of Safety Process Improvement Teams in selected work areas composed of hourly workers plus some salaried supervision. A facilitator from either the Training Department or the Safety Department was provided to each process improvement team. Also the Project Engineer was a member of each of the process improvement teams. The premise of this approach was that the hourly production workers in the specific areas knew best what the safety risks were in their work area. The Project Engineer was involved to help facilitate the group and to help implement solutions to either eliminate or mitigate the risks. These might come in the form of changes in the tools used in the production work area, adding or changing personal protective equipment, changes in the production process itself, or other factors. The production work areas selected for the pilot teams were the work areas of the production members of the Safety Process Improvement Team: Paint & Blast, Electrical and Steel Erection. They were selected because these were areas of either high frequency of injuries or areas of potential high severity of injuries. Also as the heads of these areas were already participating on the Safety Process Improvement Team, the management of these areas was committed to implementing the pilot teams.

The Blast and Paint Process improvement Team decided to look at three areas. Phase I will look at upper extremity injuries. Results of this study will be published in Deliverable B. Phase II will look at eye injuries with results to be published in Deliverable C. Phase III will look at Environmentally Compliant Spray Equipment with results to be published in Deliverable D. The Electrical Cable Pulling Process Improvement Team selected back injuries occurring during the cable pulling process. Their results will be published in Deliverable E. The Steel Erection Process Improvement Team selected back injuries. The results will be published in Deliverable F.

The second approach was the implementation of a behavioral safety program in a pilot area. The behavioral safety approach consists of extensive training of the work group and the initiation of peer observations in order to get to the underlying cause of accidents: Unsafe work behaviors. The Steel Assembly area was selected for piloting this approach, primarily because it was an area where there was a high frequency of injuries and a potential for high severity of injuries. Results from this task will be published in Deliverable G.

The end result of this project will be a guide to implementing a model successful safety program in a shipyard using a combination of hourly production worker involvement, training, and process modification and improvement using industrial engineering techniques.

In developing an approach to reducing environmental costs, the Environmental Engineering Department was consulted as to using a similar approach to eliminating or mitigating environmental costs. Their perception was that before this approach could be implemented, that there were data system issues and training issues that needed to be addressed. In particular, a major problem in all shipyards was an inadequate hazardous material tracking system. Therefore, a small percentage of the budget (5%) was allocated to the development of a hazardous material tracking system which could be used at shipyards throughout the country. Results from this task will be published in Deliverable H. Also, there is a consensus need for interactive training software to provide required environmental training on an individual basis with minimal impact on production schedules. A small percentage of the budget (5%) was allocated to developing this training software. Results from this task will be published in Deliverable I.

In order to accomplish the project objective of sharing knowledge obtained through the research conducted under this project scope, a series of yard visits are planned to disseminate project items of particular interest to a particular shipyard. Also, a series of workshops will be presented highlighting key project results and recommendations. Results from this task will be published in Deliverable J. Finally, a comprehensive final project report will be prepared for distribution to all interested parties. Results from this task will be published in Deliverable K.